

AMERICAN
PRINTING HOUSE
FOR
THE BLIND

*An Armchair Tour through the World's
Largest Publishing House and
Manufacturer of Aids for the Blind*

RECEIVED

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AMERICAN PRINTING HOUSE FOR THE BLIND

INCORPORATED

1839 Frankfort Avenue

LOUISVILLE, KENTUCKY 40206

1971

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AMERICAN PRINTING HOUSE FOR THE BLIND, Inc.

(Founded in 1858)

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General and Historical

Chartered by the Commonwealth of Kentucky in 1858, the American Printing House for the Blind is the oldest national, non-profit agency for the blind in the United States, and by far the largest publishing house for the blind in the world. Its activities are centered around the publication of literature for the blind, including textbooks and other educational materials; the development and manufacture of educational aids and appliances for their use; plus educational and technical research relating to publishing literature for the blind and the manufacture of tangible aids for the use of the visually handicapped.

Publishing for the visually handicapped by the Printing House is done in four media: Braille, i.e., embossed characters to be read by the fingers; large type textbooks for those children whose vision is too poor to use regular ink type, but who can best be educated with books printed in larger-than-average-size type; long-playing phonograph records (Talking Books) on which have been recorded books, magazines, and the like, read aloud by professional readers; and recorded magnetic tapes. In the above range of media, every type of printed literature (except the depiction of perspective) may be made available to the blind.

The manufacture of special educational aids and appliances for the blind covers such items as Braille slates and styluses (the blind person's pencil); Braillewriters, which are similar to ink typewriters but which write Braille instead; arithmetic type slates; an abacus; dissected relief maps and globes for the study of geography, also Braille atlases; geometric forms for mathematics; Braille reading-readiness aids; preschool educational devices; a science measurement kit; and a myriad of other aids.

All of these materials are produced at the Printing House for the benefit of the blind everywhere. Most particularly, since 1879, the American Printing House for the Blind has been the official schoolbook printery for all of the blind students of less than college grade throughout the United States and its possessions.

Braille Publishing

Braille is the best-known medium of reading by the blind. Invented in the early 1800's by the celebrated blind Frenchman, Louis Braille, the Braille system consists of a code composed of the 63 possible dot combinations of the following six-dot cell:



In addition to the alphabet and punctuation symbols, English Braille employs 189 contractions and short-form words, plus a number of so-called composition signs which are peculiar to Braille, e.g., numbers are represented by placing the Braille number sign before the first ten letters of the alphabet, while capital letters are indicated by preceding the letter or word with a Braille capital sign, rather than using special numbers and capital letters as in ink print. Additionally, special codes, based on the same 63 combinations of the six-dot cell but which, through variation of sequence, have different meanings, are used in writing Braille music, mathematical and scientific notations, foreign accented letters, and so on.

Hundreds of thousands of book volumes and pamphlets, as well as magazine pamphlets—totaling millions of pages—are published in Braille each year by the Printing House, for distribution throughout the world.

Braille Embossing

The first step in the publication of Braille books, magazines, music, etc., is the embossing of metal printing plates. At the present time, the Printing House employs two different methods to make these printing plates. The traditional method is to have a stereotypist (who is an expert Braillist) emboss directly onto the metal plates, translating the ink-print copy into Braille as she writes. More recently, automatic embossing of the plates through the use of an IBM computer and other automated equipment has made possible machine-translation of ink print to Braille.

The traditional method still represents the bulk of production, in so far as technical work is concerned, such as music, mathematics and science, and books of variegated and difficult format. Using the traditional method, the metal printing plates are embossed on so-called stereograph machines by skilled operators who are expert in the Braille system. To make these plates, thin sheets of zinc or sheet iron, approximately .009 inches thick, are mounted in the carriage of the stereotyping machine, having previously been folded in half and firmly creased. The stereograph



1. Manually embossing a Braille printing plate.
2. Key punching ink-print copy as original in-put for machine-translation of Braille.
3. Automatic embossing of a Braille printing plate from IBM punched cards produced by means of a computer.



4. Blind Brailist proofreads as sighted reader holds copy.
5. Correcting errors on a Braille printing plate.
6. Hand-tooling a Braille map.

machine has six levers, or keys, corresponding to the six dots of the Braille cell, plus a space bar, and is activated by either an electrically-powered mechanical clutch or electronically-directed solenoid mechanism. The stereotypist copies materials from ink print into Braille on the plate, embossing through both sheets of the plate at one time. When the first side is completed, the plate is reversed in the carriage of the machine, being automatically adjusted slightly to one side and downward so that the dots on the reverse side of the plate can be embossed between those written on the first side. The result is a double set of male and female embossing dies. To print, a sheet of paper is placed between the double plates, and both sides of embossing are imprinted on the paper at one time. This is called "interpointing."

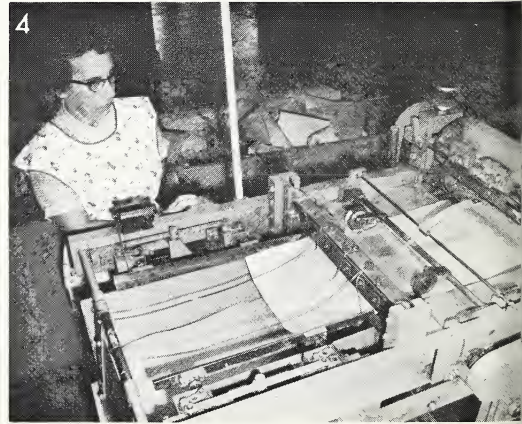
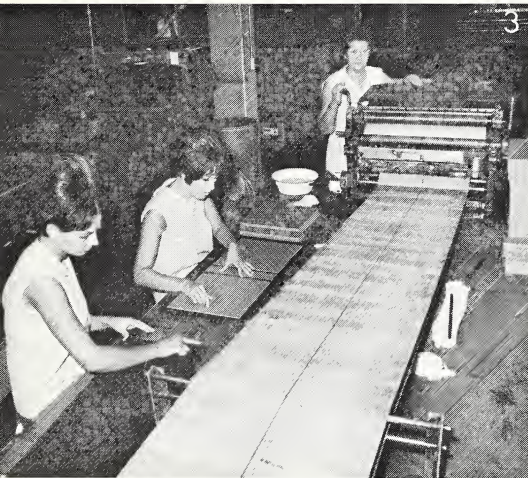
To correct errors on a Braille plate, the incorrect dots are flattened by means of special hand tools, the plate is remounted in the stereograph machine in proper line position, and the correct Braille characters embossed. As in the case of ink printing, Braille materials must be proof-read to detect errors in typesetting. For this purpose, the Printing House uses expert blind Braillists who work in pairs with sighted copyholders, so that there is constant comparison with the original ink copy as well as detection of typographical Braille errors.

The machine-translation of Braille produces the same end product—a metal printing plate. Briefly stated, the process is as follows: The ink-print copy is key-punched onto cards, using an IBM key-punch machine and an operator who knows no Braille, but who simply spells out the ink-print copy. The punched cards so produced are then sent to a center having an IBM computer, where the information on the cards is first translated onto magnetic tape and then fed through the computer which has been programmed for English Braille. The resulting tape is then fed back to a machine which translates the information to punched cards, and these cards direct the operation of the electronically-driven embossing machine to make the actual Braille plates.

Since it takes at least two years to train an accurate, fast Braillist (stereotypist), the advantage of "machine-translation," which employs a regular IBM key-punch operator who needs only a week or two of extra training, can easily be understood. Further, the actual translation of the ink-print copy to cards which will direct the production of contracted Braille and proper Braille page-and-line format is done automatically which makes the translation itself more consistent with the rules of Braille than that done by a human Braillist since it is always the same and not dependent on human interpretation which varies from individual to individual. This does not mean that machine-translation of Braille will shortly entirely replace the traditional method of production, for present computer programs for Braille are still only basic, and have not yet been developed to direct the production of all the technical Braille codes for



1. Printing a Braille book on hand-fed platen press.
2. Binding Braille books: FRONT CENTER — folding printing pages; RIGHT — inserting binding rings into folded, punched sections of printed pages; LEFT CENTER — closing rings; FAR LEFT — riveting ringed sections into cover.
3. Making covers for Braille books.



4. Printing Braille magazine on an automatically-fed press.
5. Gathering pages of a Braille magazine from revolving round table before creasing, folding and stitching.



mathematics and science, music, computer notations, technical formats, and so on. However, research and developmental work is constantly in process, looking to the possibilities of developing computer programs for the translation of all Braille codes.

Braille Printing and Binding

The printing of Braille materials is accomplished by mounting two interpoint Braille plates on the press at one time, so that a run of four pages is printed with each stroke of the press. The resulting sheets are then folded and collated, ready for binding as regular hard-covered books or as pamphlets, as may be required.

Braille Books (both hard-covered and pamphlet bindings) are printed on hand-fed platen cutting-and-creasing presses which have been adapted for the purpose. The special Braille paper for books is always dampened before it is to be printed, so that it will be in condition to stretch somewhat without breaking during the printing process and, upon drying, will shrink to a hard, firm dot. After being printed and dried, Braille book pages are folded and collected into volumes ready for binding. It is necessary to hand-fold Braille sheets, as no mechanical method has as yet been devised to do this job without damaging the embossed dots. For Braille book-binding, three sheets (or runs) are folded together to form a 12-page signature. For stitched Braille book pamphlets, the entire set of sheets, with their heavy paper covers, are folded and collated into one signature ready for stitching. Before being bound or stitched, all pages of all volumes or pamphlets are collated and inspected to check for defects in paper, printing, etc., and to insure proper sequence of pages.

Bound books, as opposed to pamphlets, are encased in heavy cloth-covered bindings, using a patented mechanical binding. To make the cover cases, sturdy cloth (usually imitation leather or buckram) is glued to 90-point binding boards and a center spine. Ink-print and Braille identification is then respectively foil-stamped and embossed on these covers. To bind the printed sheets in the cases, the signatures are punched along the folded edge and gathered into metal rings attached to a slim flat metal piece as long as the spine. The metal rings are then mechanically closed into the metal piece, and the whole section riveted into the case. This method provides a quickly completed and durable binding, and has the added advantage to the blind of permitting the pages to lie flat when being read. Braille volumes may run in size from 80 to 300-odd pages (the latter for dictionaries and encyclopedias) but usually average between 160 and 180 pages of 2 to 3 inches in thickness.

Braille book pamphlets are bound in two ways, employing either the traditional saddle-stitched form or plastic-ring bindings. In the case of stitched pamphlets, the folded and collated sheets, with their heavy jute-

paper covers printed in both ink-print and Braille, are stitched together into pamphlet form. For plastic-ring bindings, the sheets, with their Braille-and-ink-printed covers, are punched along the binding edge similarly to the signatures for bound books, and the full complement of sheets and cover placed in a plastic-ring scroll or comb.

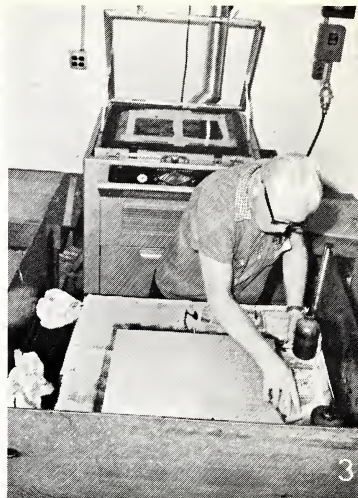
Between 140-150,000 bound volumes and 75-80,000 pamphlets are produced each year.

Braille Magazines are printed on web-fed automatic presses, using a special heavy paper, printed dry. The covers are first printed in ink print with the proper information required by the Post Office. (All magazines are circulated postage free, even those for which a subscription fee is charged going free through the mails.) A commercial Kelly press has been adapted for sheet-printing of Braille, while three specially built presses, printing from paper rolls, are also employed for faster and cheaper operation. When the sheets of an entire magazine have been printed, the stacks of runs are placed in order on a revolving circular gathering table 12¾ feet in diameter. As the table revolves, the individual sheets of a magazine are gathered in sequence and deposited in a stack. The sheets for each pamphlet are then folded by being scored in a special machine, folded together by hand, and then run between two reverse rollers to finish the creasing. Finally, the magazines are stitched and are then ready for mailing, either in envelopes, boxes or wrappers.

The American Printing House for the Blind prints and distributes some 60-odd Braille magazines on schedule—from weeklies to annuals—mostly for other non-profit agencies for the blind. These publications comprise hundreds of thousands of pamphlets each year. While many of these periodicals are published for a wide variety of religious faiths, or for special interest groups of blind people such as ham radio operators, piano tuners, musicians, blind computer programmers, etc., they also include such nationally known magazines as *The National Geographic*, *Children's Digest*, *Current Events*, *My Weekly Readers*, *Fortune*, *Atlas*, *Datamation*, and so on. One of the best known and most highly prized by blind readers is the Braille edition of *The Reader's Digest*, which is published monthly in four pamphlets, each 13½" × 11" × 1⅛" in size. This Braille magazine has been available through donations from the public since September, 1928.

Braille Vacuum-forming

In addition to the major process of press-printing multiple copies of Braille materials, the Printing House also has facilities for the Vacuum-forming of single copies of Braille books and pamphlets from hand-transcribed paper masters. Briefly stated, this process vacuum-forms Braille on thin plastic sheets, using embossed paper masters which have



1. Redrawing illustrations to make them more legible.
2. Repaging copy in negative form.
3. Completing a large type plate ready for printing.
4. Printing a large type book.
5. Silk-screening covers of a large type book.
6. Binding a large type book. (Note book press at right used to provide pressure to complete the drying of the process of gluing the books into their covers.)

been originally Brailled by hand on either a Braille slate or Braillewriter. Such materials are bound with heavy jute-paper covers and are held together by plastic rings (combs).

The success of this project is due to the cooperation of many volunteer Braille transcribing groups who place on indefinite loan with the Printing House the Braille paper masters of textbooks which they have originally transcribed for the use of a single blind pupil. By placing these masters with APH, it is possible for the Printing House to make copies of any title and supply them at no cost to the schools or students needing the books through a Federal grant made to APH for the purpose of supplying educational materials to students of less than college grade throughout the United States. Such cooperation also prevents needless duplication of hand-transcribing the same title by many volunteers.

Large Type Textbooks

The Printing House publishes large type textbooks for the benefit of visually handicapped school children Grades I through XII who have sufficient vision to read larger-than-average ink print, but who cannot read ordinary size type. The printing is effected by the off-set process, the original print copy being "blown-up" photographically, usually to 18-point type (approximately $\frac{1}{4}$ " high). The printing and binding processes are identical to those of regular commercial off-set ink-printing, i.e.:

Layout and Plate-making:

- (1) Editing to delete or redraw pictures to make them more legible.
- (2) Making blown-up photographic negatives of the original copy.
- (3) Stripping, opaquing and masking negatives for page layout.
- (4) Exposing and developing printing plates ready for press.

Printing and Binding:

- (1) Printing the pages on automatic off-set presses, on an off-white, non-glare paper.
- (2) Folding, collating and binding, either in hard-covered or paperback volumes, or paperback stitched pamphlets. Recently, the APH has adopted the Perfect binding process for all bindings but very slim pamphlets of a few pages, which must still be saddle-stitched. This process is like that used in binding telephone books; however it is much stronger, and has the real advantage of permitting the pages to lie flat when the book is opened.

- (3) Silk-screening the cloth-covered bindings to reproduce pictures, etc., to approximate the covers of the original ink-print edition, or ink-printing the covers for paperback bindings.

In addition to multiple-copy reproduction of textbooks, as described above, the Printing House has a short-run process for the production of from one to five or more copies of textbooks. This process is similar in many respects to the one described above, but it makes only direct blow-ups of the original copy, with no editing, stripping, or preparation of negatives which provide for "cleaning-up" the original copy which does not reproduce well because of color or fuzzy copy, or which makes the copy more meaningful for the partially seeing user. Further, the size of type is limited by the page size of the press, which can produce a page no larger than 10" × 15" only, which, in the case of books originally printed on large pages with small type, may not increase the blow-up to more than 14-point type. This short-run method of production, however, is useful in many situations, and is much used by schools and classes for their visually handicapped students.

Currently, some 75-80,000 large type books and pamphlets, comprising nearly 15,000,000 pages are produced each year. It should be noted, however, that the Printing House produces only textbooks for elementary and high school use in this form, and does no large-type publishing of general literature or magazines, either for children or adults.

Talking Books

A Talking Book record is a long-playing phonograph record which, for books, runs at a speed of 16-2/3 r.p.m., for an average of 45 minutes per side of a 10-inch disc. Recordings of magazines run at a speed of 8-1/3 r.p.m. and have a playing time of as long as 2 hours per side on a 12-inch disc.

The process of making a Talking Book record is as follows: In the recording studio, professional readers "read" into a microphone which picks up the reader's voice and transforms it into electrical vibrations which, in turn, are transmitted to a tape-recorder where magnetic charges are deposited on a plastic magnetic tape. When the recording has been completed, the tape is taken to the mastering department, where it is mounted on another tape recorder-reproducer and played back to record a master lacquer disc. In this process, the magnetic charges of the reader's voice are transformed into electrical impulses which, after passing through the various electronic parts of the recording channel, are terminated at the cutting head of the recording machine, being there transformed into lateral undulations in the groove being cut in the master lacquer disc. The metal master is made by an electroforming process.

To produce a finished record, two metal masters are mounted in a record press, and a vinyl plastic material is molded into the form of a record by means of pressure and heat. The final product is a long-playing phonograph record on which books, stories, and magazines, rather than music, have been recorded.

At the present time, the Printing House produces nearly 3,000,000 Talking Book records per year, comprising full-length books, plus 29 nationally known magazines, such as *Newsweek*, *The Reader's Digest*, *Atlantic*, *Harper's*, *Sports Illustrated*, *Jack and Jill*, *Ellery Queen*, *Farm Journal*, *American Heritage*, *Saturday Review*, Jr. and Sr. *Scholastic*, *Changing Times*, and so on.

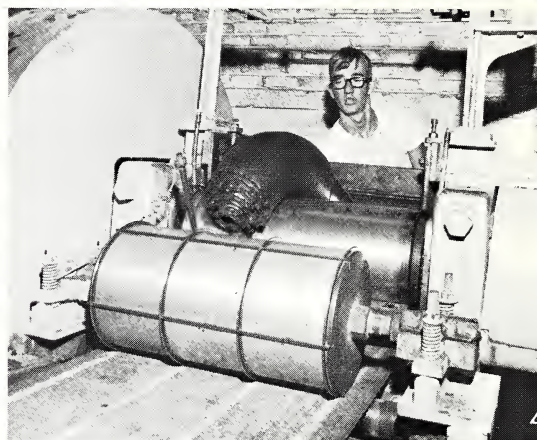
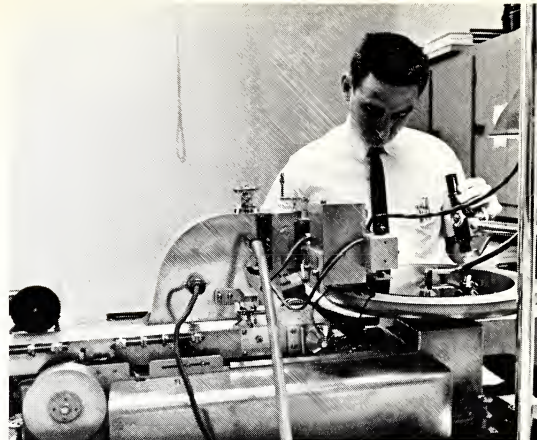
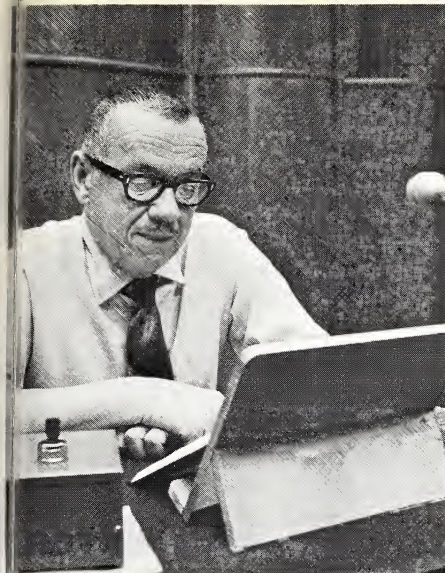
Talking Book Recording

Talking books are "read" in sound-proof studios similar to those of a broadcasting station. Here, the reader reads into a microphone, which is connected to a tape recorder. Directly in front of each reading studio proper is a copyholder's control room. The copyholder is responsible for following the copy as the reading is being done, and for checking accuracy of pronunciation and reading of copy, artistic and mechanical quality, and for operation of the tape recorder.

Separate from the reading studios and copyholders' rooms are the recording or mastering rooms, which contain the disc recording machines, tape reproducers and the instrument panels which control the volume and balance of the readings. It is here that the speed of recording is controlled, as well as the number of grooves-per-inch of radius of the record—the latter usually about 300, which produces 45 minutes per side of a 10-inch record when recorded at 16-2/3 r.p.m.

Electroplating of Metal Masters

Following the mastering process, the master lacquer record is taken to the electroplating department where a metal "pressing master" is built up on the face of it to be used to press the finished record. The electroplating process consists of first depositing a metallic film on the surface of the lacquer disc in order to provide a means of electrical contact during the electroplating process, and the actual build-up of the metal master by means of electrolysis. The deposition of the metallic film is done by means of a revolving turntable, where a wetting agent is sprayed on, followed by a thin coating of metallic silver by chemical deposition. Following this, a nickel plate is built up on the metalized surface of the recorded lacquer disc to form an exact, but reverse, reproduction of the recorded grooves. It requires about 4 hours to build up the necessary thickness of .008 inches for the metal master.



1. Skilled reader recording a talking book; copyholder is following ink-print text as well as controlling tape-recording machine.
2. Checking the quality of the original recording as a master for electro-plating is made.
3. Proofreading a talking book test-pressing.
4. Two-roll milling machine finishes compounding of record stock for pressing talking book records.
5. Pressing a talking book record.
6. Checking finished records and inserting them in envelopes preparatory to boxing in circulation containers.

Talking Book Proofreading

Test pressings of all recordings are sent to this department to be read and checked for mechanical and reading defects, such as incorrect pronunciation, extraneous background noises, clicks, etc. If flaws are found in the test pressings, it may be necessary to have the reader completely re-read the passage on a new tape, and to then re-record from this tape onto a new lacquer disc, which in turn must be electroplated and a new test pressing made. When the test pressing is found acceptable, the pressing department is notified to go ahead with manufacturing the required number of copies.

Record-stock Compounding (Millroom)

The materials used in making the final Talking Book record are compounded from various ingredients—vinyl resin, stabilizers, plasticizers and lubricants. These materials, in proper mixture, are put through a Banbury mixer under heat and pressure. After an approximate 5-minute cycle, each batch is discharged and transferred to a two-roll mill where it is finally blanked out into the shape of 5-inch rectangles for cooling. These rectangles are then put through a grinding machine where the plastic is converted to granular form. The plastic granules are then conveyed to each record-molding press in the pressing department.

Record Pressing, Inspection and Packing

To mold a Talking Book record, a preheated preform (formed from the plastic granules) is placed in a record press between two metal-masters, under extreme heat and pressure, in order to form a double-faced pressing, or record. The molding die on the press goes through a complete heating-and-cooling cycle by steam and water each 30-35 seconds, being heated up prior to and during the molding process and cooled at the end to set and maintain the shape of the record before the latter is withdrawn from the press. A total pressure of about 90 tons is required to mold each record, and is obtained by a hydraulic medium. An ink-print label is applied to one side of each pressing and a Braille identification is molded into the other side. To finish the records, which are quite flexible and break-resistant, the edges are individually machined for smoothness.

The completed records are inspected, inserted in envelopes, stacked for collecting into sets, and packed for shipping.

Tape Duplicating

In addition to Talking Book records, used primarily for producing books and magazines of general interest, the Printing House also provides a program of tape recordings for use as supplementary materials in the classroom. Teachers may request any tapes from the Printing House

REAL (Record Educational Aids to Learning) catalog which help to add interest or information to the regular course of instruction. Subjects covered by the tape catalog include: foreign languages, music, science, health, history, mathematics, etc. Currently, all REAL tapes are dubbed at a speed of $7\frac{1}{2}$ i.p.s., and provide from 15 to 30 minutes of recorded material per tape.

In addition to the tapes produced for the Printing House REAL Program, many thousands of tapes are being duplicated for use in the special tape program of the Division for the Blind and Physically Handicapped of the Library of Congress. Most of the tapes being duplicated were originally recorded by volunteers. This program provides taped material of limited interest, which otherwise could not economically be included in the Library service.

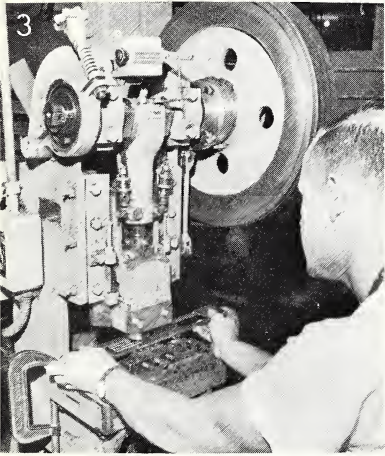
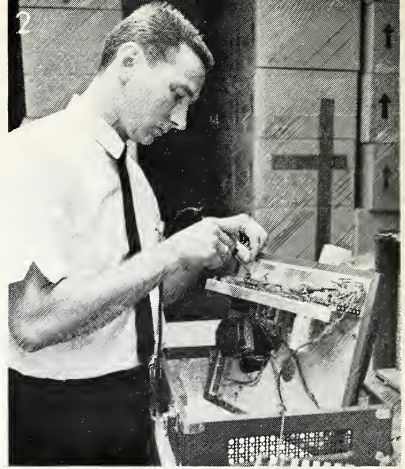
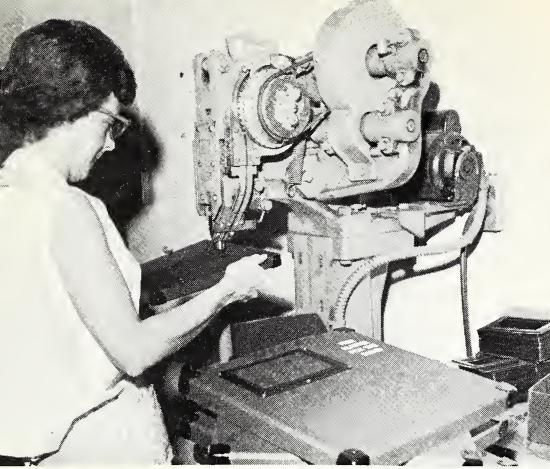
The Printing House has two high-speed tape duplicators. These units can produce open-reel tapes of any type in use today, with any track of speed configuration. For duplication, a master tape is placed on the master tape-reproducer, and 5 blank tapes are placed on the "slave" recorders. This unit runs at eight times the speed of the original recording, thus producing 5 copies in $\frac{1}{8}$ th the time it would take to listen to the original. Also, if the tape has several tracks, all tracks are recorded in one pass through the duplicator.

Late in 1970, APH undertook the duplication of tape cassette books for the Library of Congress, through the use of high-speed equipment which can produce 20 copies of a cassette tape at one playing of the master. Currently, the Printing House has two sets of this equipment available for full-time use.

Electronic Assembly Department

In addition to developing and assembling two models (portable and stationary) audible goal locaters, this department is concerned with the assembly, respectively, of both Talking Book reproducers (phonographs) and specially designed tape recorders, to be used by blind users of Talking Book records and recorded tapes. The parts and cases of these pieces of equipment are purchased from commercial manufacturers (with the exception of certain special adaptations made by APH engineers) for assembly in our plant. In the case of Talking Book reproducers, it should be noted that not all commercially available phonograph machines are suitable for playing Talking Book records (they usually damage them), and it is for this reason that special reproducers are provided for "listeners" of these records.

Both types of equipment have special features not found in most commercially available counterparts, e.g., the tape recorder provides a way of superimposing a sound indexing system on the sound tracks, so



1. Fabricating talking book circulating containers (Such containers for mailing Braille materials are also produced).
2. Assembling a talking book reproducer.
3. Dye-punching the guide for a Braille slate.
4. Assembling a Braille writer.
5. Touching-up paint on a 30-inch floor-pedestal globe.
6. Assembling the pocket abacus.



that a student can make easy reference to needed information. There are also two models of both the reproducer and the tape-recorder, one which runs at standard set speeds, and one which provides a system of variable speed of running, controlled by the user, which may best suit the need of the student or reader. These latter features of tone-indexing and variable speed are special adaptations developed by Printing House engineers.

The latest addition to the products from this department is a portable tape cassette recorder-player. These machines provide standard running speeds of 1 7/8 and 15/16 i.p.s., plus a variable-speed model.

Mailing Containers; Talking Book Albums (See page 17.)

Educational Aids and Other Appliances

In addition to publishing books and magazines for the blind in several media—Braille (including Braille music), large type textbooks, Talking Books (disc recordings), and tape recordings—the Printing House also manufactures a large variety of special educational aids for the blind. These appliances include such items as: Braille slates and styluses, Braille-writers, special notebook covers and binders, embossed and bold-line writing paper, relief globes and maps, Braille atlases, an abacus, arithmetic slates, geometrical forms (solids, planes, and wire outlines), an appliance for illustrating algebraic equations or geometrical problems, embossed and bold-line graph sheets, a large wooden erector set for small children, and so on. Not all items are under manufacture at all times, since it is more economical to make many items in quantity lots to meet the demand for several months or a year or two. Following is a description of a few of the best-known devices:

Braille Slates and Styluses

The Braille slate is the simplest form of device for writing Braille. It is to the blind what the pencil is to the sighted. A slate consists of a hinged metal (or plastic) frame or guide between the two parts of which is placed a piece of paper so that the dots can be punched downward manually by means of a stylus. To write on a Braille slate, it is necessary to proceed forward from right to left, so that when the paper is turned

over it may be read as in ink print—from left to right. Braille slates come in various sizes for different uses, the large desk slate, mounted on a board, being the most popular for the schoolroom, although the average blind individual prefers the medium-sized pocket slate for his personal use.

Braillewriter Assembly

As the Braille slate is the blind man's pencil, so the Braillewriter is analogous to the regular typewriter. This machine provides a method of writing whole Braille characters at a single stroke, rather than having to punch out the individual dots by hand with a slate and stylus. It also has the advantage of writing upwards, so that what has been written can be immediately read with the fingers. Each machine is provided with six keys, one for each dot in the Braille cell, plus a space bar, so that with every downward stroke any single dot or combination of dots can be embossed. A space-bar and back-spacer are also provided similar to those on a regular typewriter. The Printing House distributes two different models of Braillewriters.

Maps and Globes

Large and small relief globes, as well as dissected relief maps of the United States and the various continents, are manufactured for use in schools and classes for the blind. A large, 30-inch diameter, floor-pedestal globe, of hollow construction, is molded from a liquid plastic with glass-fibre reinforcement, and mounted on a sturdy metal base with a correctly angled axis. The relief maps of the various continents are hand-carved from wood, although the two of the United States are molded (a small desk-sized map from semi-rigid rubber and a large easel map from vinyl plastic). Two small, 12-inch, hollow plastic globes, with sturdy wooden bases, plus plastic-formed maps of the United States are also available. All globes and maps are painted in bright colors because many so-called blind children have a good deal of residual color vision.

Auxiliary Service Departments

The Printing House has three special departments which act as auxiliary services to the rest of the plant.

Ink-printing Department

In this department (equipped with hand-fed platen-presses, foil-stamping machines, and hydraulic stamping machines) are printed the ink-print title pages and spine title for Braille and large type books and pamphlets, ink-print covers for Braille magazines, ink-print Talking Book record labels, as well as spines for Talking Book containers, alphabet cards, stationery, office forms, etc., etc. By and large, the processes employed are those of any commercial ink printshop.

Machine Shop

The Printing House boasts one of the finest, small machine shops in the city of Louisville. Here is done almost all of the maintenance of machinery and equipment, plus the development and manufacture of new equipment for the entire plant.

Talking Book, Tape, and Braille Book Shipping Containers; Talking Book Albums

Heavy, fiberboard shipping containers, for Talking Book Records, tapes, and Braille books, are also manufactured by the Printing House. The rugged, weather-resistant construction of these cases is necessary in order to withstand the heavy wear to which they are subjected through repeated mailings, and also to protect the contents of the containers. These containers are made in various sizes, as needed, including custom-sized boxes.

Currently, research looking to the manufacture of plastic containers for Talking Book records, open-reel and cassette containers is at the stage where many thousands of such containers are being field-tested.

In addition to mailing containers, special album cases for Talking Book records are manufactured for home and library use, and are manufactured on special order.

Non-Manufacturing Services

In addition to its major responsibilities of publishing books and other literature for the blind, plus manufacturing educational aids for their use, the Printing House also conducts other operations which are directly oriented to the improvement of educational materials and other services for blind children and adults.

Research and Development Activities

A wide range of research and development activities are conducted at the Printing House.

1. The Educational Research, Development and Reference Group is the site of much of this work.

a. The Behavioral Research Section conducts basic research on tactual perception and the application of listening to learning.

b. The Educational Materials Research and Development Section develops educational materials in the science, mathematics, social studies and reading areas. This section is part of the Instructional Materials Reference Center which also includes the reference activities described below.

2. Personnel of the Editorial and Braille Embossing Departments, as well as the Behavioral Research Group, are involved in research concerning all Braille codes.

3. The Data Processing Department is engaged in the development of computer programs for the translation of all Braille codes.

4. The Recording Department is involved in the development of new and more efficient processes for their activities, including the adaptation and manufacture of special equipment for the use of records and tape recordings.

5. The Plant Operation, responsible for the printing and binding of all Braille and large type publications, is involved in much research accompanying printing and manufacturing activities.

Educational Reference Services

These services are supplied through the Reference Section of the Instructional Material Reference Center which is a part of the nation-wide IMC/RMC network.

Although the Printing House is responsible for providing educational materials used by blind children throughout the country, it is not always possible to provide all books needed by individual children, where the overall demand for such texts is small. To make it possible for each child to have the texts used by his seeing classmates, thousands of volunteers produce materials in Braille, on records or tapes, or in large type. In order to coordinate the services of the volunteers, a Central Catalog of Volunteer-Produced Books has been set up in the Instructional Materials Reference Center, to which the volunteer transcribers report the books they produce. In return, the APH provides daily reference service to

pupils, teachers, and parents in need of particular texts. This makes possible the interchange of materials all over the nation, eliminating the necessity of constant duplication of books already available. Currently the Central Catalog contains between 20-30,000 entries.

Other reference services include the publication of lists and catalogs of materials available commercially which would be useful for the visually handicapped, plus a program of exhibit and presentations to relevant educational institutions. This unit also has a Model Shop where experimental designs and models are produced and prototypes are readied for use by the field researchers and the plant's production department. The Instructional Materials Reference Center also includes a Professional Library for the APH Staff.

Administration

As a private, non-profit corporation, the affairs of the Printing House are administered by a Board of Trustees consisting of seven citizens of Louisville, successors to the original incorporators. The officers of the Board include a President, Vice-President, Secretary, and Treasurer, all elected annually. Additionally, all superintendents of schools for the blind (or their designees), and all chief state school officers (or their designees) are ex-officio members of the Board of Trustees for the administration of the Federal Act of 1879 "To Promote the Education of the Blind". The paid executive staff consists of an Administrative Vice-President and General Manager, and eight department heads, namely, Plant Manager, Editor, Head of Talking Book Department, Director of Educational Research, Director of the Volunteer Catalog and Reference Service, Head of Magazine Circulation and Fund-raising, Head of IBM Operations, and Office Manager, and their assistants. Approximately 500 full-time and 40 part-time employees are required to produce the materials offered in the Printing House catalogs.

The operations of the institution are financed in three ways. First, and best known, is the Federal Act of 1879, which provides an annual appropriation to the Printing House for the manufacture of the educational texts and aids used by blind students, of less than college level, throughout the United States and its possessions.

Secondly, as a private, non-profit publisher for the blind, the Printing Houses contracts with other non-profit agencies or individuals to manufacture books and aids for distribution to the blind at cost or less, usually free.

Finally, through its own fund-raising efforts, the Printing House publishes Braille and Talking Book editions of *The Reader's Digest* each month, and recorded weekly copies of *Newsweek Magazine*. Additionally, donations from the public are used to finance the erection of buildings and the acquisition of machines and equipment for manufacturing operations.

Catalogs

Ink-print catalogs of the thousands of items manufactured by the Printing House are available upon request. These cover Braille books and magazines, Braille music, Large Type textbooks, Talking Books (both books and magazines), Recorded Educational Tapes, and Educational Aids.

Tours

Tours through the manufacturing plant can be taken between the hours of 9:00 a.m.-12:00 noon and 1:00-4:00 p.m., Monday through Friday. No tours are started after 10:45 in the morning or 2:45 in the afternoon, since it takes approximately an hour and a half to go through the building. We cordially invite you to visit us.

